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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In the application of | ) | |
| KIRT E. WHITESIDE | ) | Group Art Unit 3618 |
| Serial No. 09/780,603 | ) | Jeffrey J. Restifo, Examiner |
| Filed February 12, 2001 | ) | |
| For MECHANIC'S CREEPER | ) | |

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on this 8th day of June, 2005

Norma J. Payerle, Secretary to Edward G. Greive

# TRANSMITTAL SHEET

Enclosed are the following documents:

Appellant's Reply Brief with attached Certificate of Mailing

Appendix A

Appendix B

Return Receipt Postcard

**In the event that a fee is required, the Commissioner is hereby authorized to charge payment of any fee associated with this communication to Deposit Account No. 18-0987.**

Respectfully Submitted,

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Attorney for Applicant

June 8, 2005

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Norma Payerle, Secretary to Edward G. Greive

## APPELLANT'S REPLY BRIEF PURSUANT TO 37 C.F.R. 1.193(a)

Mail Stop Appeal Brief-Patents
Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

In his answer, the Examiner repeated his rejections under 35 U.S.C. § 103 of claims 1-3 as being obvious in light of the Miles et al. U.S. Patent No. 5,892,062 (hereinafter "Miles") in view of Bonzer et al. U.S. Patent No. 4,559,699 (hereinafter "Bonzer") and Block U.S. Patent No. 4,034,434 (hereinafter "Block"), and claims 4 and 5 as being obvious in light of Miles, Bonzer, and Block in view of Doyle et al. U.S. Patent No. 4,707,880 (hereinafter "Doyle"). However, as discussed in the Appellant's appeal brief, the Appellant disagrees with the Examiner's rejections, and maintains that the Examiner has not established a prima facie case of obviousness.

"To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). In the present case, regarding independent claim 1, the combination of Miles, Bonzer, and Block

does not teach wheels having a wheel body with a hemispherical or semi-elliptical cross-section with a hardness ranging from about 65 to 85 on the Shore D hardness scale. In fact, the combination of Miles, Bonzer, and Block teaches away from the Appellant's invention as claimed in independent claim 1.

The apparatus resulting from the applied prior art would include the casters disclosed in Bonzer attached to the side rails disclosed in Miles. However, Bonzer teaches that the caster wheels should be substantially deformable to maintain contact with the working surface, with the hardness of the material forming the tire-like portion (69) ranging from 50-70 on the Shore durometer type A scale (Column 5, Lines 24-25). Furthermore, Block does not actually disclose that the part of a wheel in contact with a work surface is composed of the material having a hardness of 65/75 Shore D Durometer. Instead, Block discloses a roller segment (42) having an inner core (66) formed from a rigid vinyl material having a Shore D Durometer of 65/75 and an outer core (64) formed from a softer vinyl material having a Shore A Durometer of 40/50 (Column 3, Lines 64-67). Thus, the inner core (66) does not contact the surface on which the roller segment (42) is placed because it is surrounded by the outer core (64). Consequently, Block serves only to reinforce the teachings of Bonzer. Unlike the Appellant's invention as claimed in independent claim 1, the combination of Miles, Bonzer, and Block teaches, if anything, that the material forming the outer surface of a wheel must be relatively soft compared to the core of the wheel. As such, the Appellant maintains that independent claim 1 is allowable over the combination of Miles, Bonzer, and Block. Furthermore, because independent claim 1 is patentably distinct from the applied prior art, and because, as discussed in the Appellant's appeal brief, at least some of the dependant claims also include independently patentably distinguishable subject matter, claims 2-5 are also allowable over the applied prior art.

In his answer, the Examiner has also, in his own words, "included a chart illustrating Shore D scale versus Shore A scale in an attempt to illustrate that certain rubbers/polymers/plastics can fall between the Applicant's recited range of 65-85 Shore D and also within Bonzer et al.'s range of 50-70 Shore A (see fig. 1)." (Examiner's Answer, p. 5) To support his contention, the Examiner emphasizes a single experimental result depicted in the Examiner's fig. 1. However, the single experimental result emphasized by the Examiner appears

to be anomalous, and the web-page which includes the Examiner's fig.1 actually discourages correlation between the Shore A and Shore D hardness scales. Therefore, in addition to refuting the Examiner's application of Block regarding the recited range of hardness of the wheel body being from about 65 to 85 on the Shore D hardness scale as claimed in independent claim 1, the Examiner's contention regarding fig.1 and Bonzer can easily be refuted, as now to be discussed.

The web-page including Examiner's fig. 1 is found at www.matweb.com, and corresponds to three (3) printed pages provided for the Board's convenience as Appendix A. The web-page discusses the Shore Durometer hardness testing of various plastics, and uses various charts detailing experimental results (including Examiner's fig.1) to discuss correlations between the Shore A and Shore D hardness scales for various plastics.

The various charts include both Shore A and Shore D hardness measurements of various plastics. These experimental results are used to illustrate whether there is a reliable correlation between the Shore A and Shore D hardness scales. However, given the grouping of a substantial majority of the experimental results shown in Examiner's fig. 1, it appears that, although the correlation between the Shore A and Shore D hardness scales may be somewhat unreliable, the single experimental result emphasized by the Examiner is remarkably inconsistent with the other experimental results. As such, the single experimental result emphasized by the Examiner would likely be ignored when interpreting the Examiner's fig. 1.

It is important to note that only the printed page including the Examiner's fig. 1 was provided as part of the Examiner's answer. The printed page which included an interpretation of the various charts (including Examiner's fig. 1) was not provided by the Examiner. The printed page including this interpretation indicates that "as seen in the charts below, the correlation between the two Shore Durometer hardness scales [Shore A and Shore D] is weak." Therefore, even if the single experimental result emphasized by the Examiner was deemed valid, the web-page which includes Examiner's fig.1 actually discourages correlation between the Shore A and Shore D hardness scales. Consequently, the web-page including the Examiner's fig. 1 disparages the Examiner's contention.

To further demonstrate the fallacy in the Examiner's contention that certain rubbers/polymers/plastics can fall between the Appellant's recited range from about 65 to 85 on the Shore D hardness scale and also within Bonzer's range of 50-70 Shore A, the Appellant urges the Board to visit www.glscorporation.com/pdf/tips/hardness_tip.pdf. This web-page is included as Appendix B for the Board's convenience, and includes a reference chart further detailing the relationship between the Shore A and Shore D hardness scales. The reference chart indicates that the Shore A and Shore D hardness scales share, albeit with some overlap, a continuum with the Shore A scale covering softer materials and the Shore D scale covering harder materials. As such, even though it may be somewhat unreliable, the only correlation between the Shore A and Shore D hardness scales is at the overlap. Therefore, because the Appellant's recited range of from about 65 to 85 on the Shore D hardness scale and Bonzer's range of 50-70 Shore A do not overlap, the reference chart also contradicts the Examiner's contention.

In his answer, the Examiner has also indicated that "the appellant defines the hardness of the wheel body by reciting 'when used on a work surface the shape of said wheel body remains substantially unchanged,'" and that "this could read on any wheel." (Examiner's Answer, p. 5). Furthermore, the Examiner indicates that "the appellant does not recite in the claims that the 'entire wheel body' must be composed of the material, therefore the hub of Block reads on the limitation." (Examiner's Answer, p. 5). However, the Examiner's contentions are not well founded. In independent claim 1, the Appellant has recited that the hardness of the wheel body is from about 65 to 85 on the Shore D hardness scale, and the recitation that "when used on a work surface the shape of said wheel body remains substantially unchanged" is used to indicate the part of the wheel body having a hardness according to the recited range on the Shore D hardness scale. As such, independent claim 1 does not read on any wheel, and, because Block discloses a roller segment (42) having an inner core (66) formed from a rigid vinyl material having a Shore D Durometer of 65/75 and an outer core (64) formed from a softer vinyl material having a Shore A Durometer of 40/50, Block is not relevant to independent claim 1.

In conclusion, for reasons expressed herein and in the main brief, Appellant believes that the Examiner's rejections are not well taken, and, as such, a reversal by the Board would be appropriate.

Respectfully submitted,

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June 8, 2005

# Shore (Durometer) Hardness Testing of Plastics

The hardness testing of plastics is most commonly measured by the Shore (Durometer) test or Rockwell hardnes: Both methods measure the resistance of plastics toward indentation and provide an empirical hardness value that doesn't correlate well to other properties or fundamental characteristics. Shore Hardness, using either the Shore / Shore D scale, is the preferred method for rubbers/elastomers and is also commonly used for 'softer' plastics suct polyolefins, fluoropolymers, and vinyls. The Shore A scale is used for 'softer' rubbers while the Shore D scale is u: 'harder' ones. Other Shore hardness scales, such as Shore O and Shore H hardness, are rarely encountered by r plastics engineers.

The Shore hardness is measured with an apparatus known as a Durometer and consequently is also known as 'Durometer hardness'. The hardness value is determined by the penetration of the Durometer indenter foot into th sample. Because of the resilience of rubbers and plastics, the indentation reading my change over time - so the indentation time is sometimes reported along with the hardness number. The ASTM test method designation is A: D2240 00 and is generally used in North America. Related methods include ISO 7619 and ISO 868; DIN 53505; a K 6301, which was discontinued and superceeded by JIS K 6253.

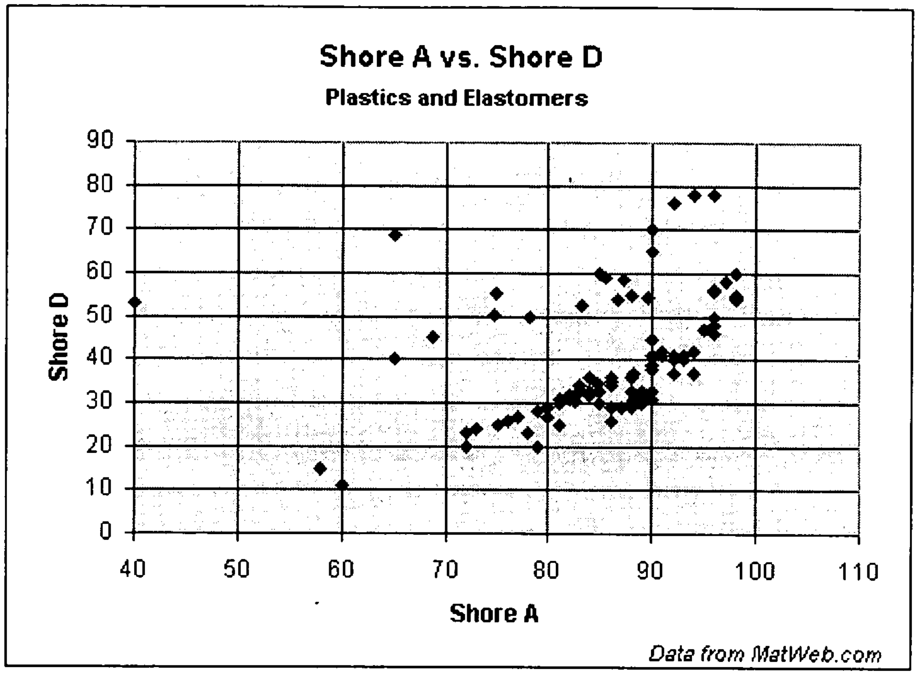
The results obtained from this test are a useful measure of relative resistance to indentation of various grades of polymers. However, the Shore Durometer hardness test does not serve well as a predictor of other properties suc strength or resistance to scratches, abrasion, or wear, and should not be used alone for product design specificati

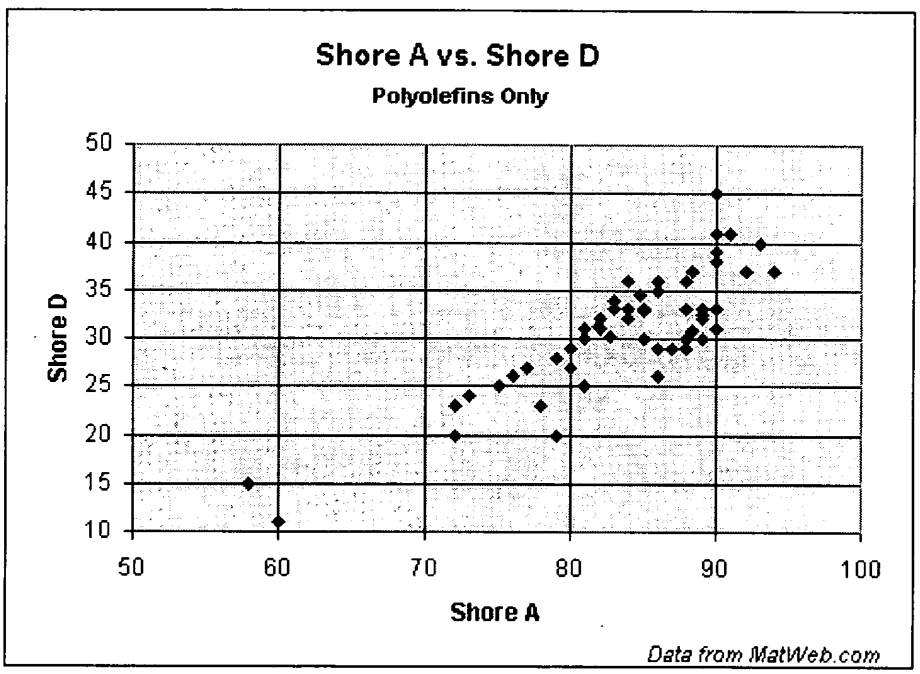
As seen in the charts below, the correlation between the two Shore Durometer hardness scales is weak; attempts conversion between the scales are therefore discouraged. The correlation is higher for materials with similar resili properties, but is still too low for reliable conversions. Likewise, conversion between Shore Hardness and Rockwe hardness is discouraged.

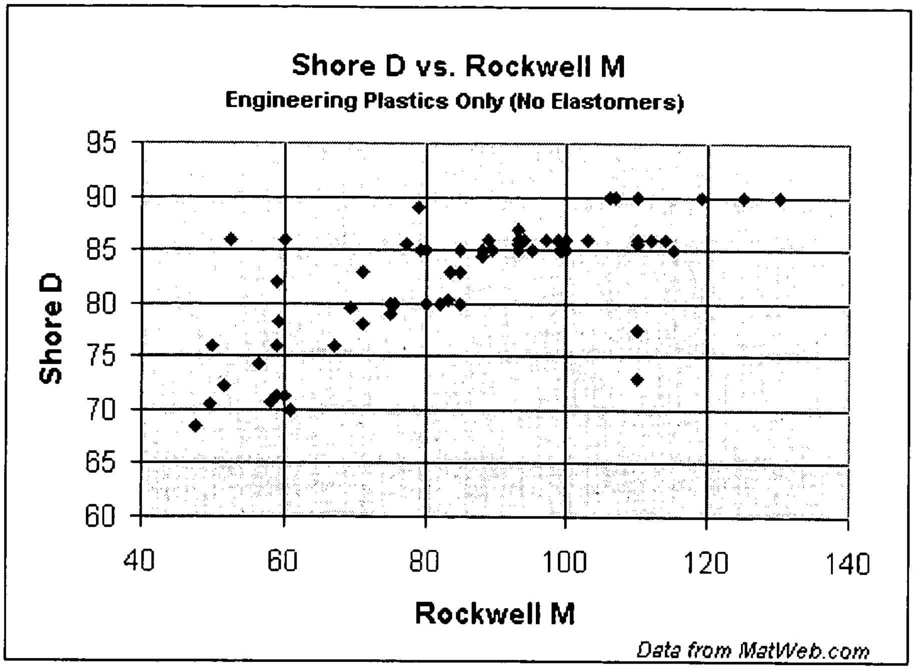
*The charts below are taken from data in MatWeb's database provided by polymer manufacturers for specific prod. grades.*

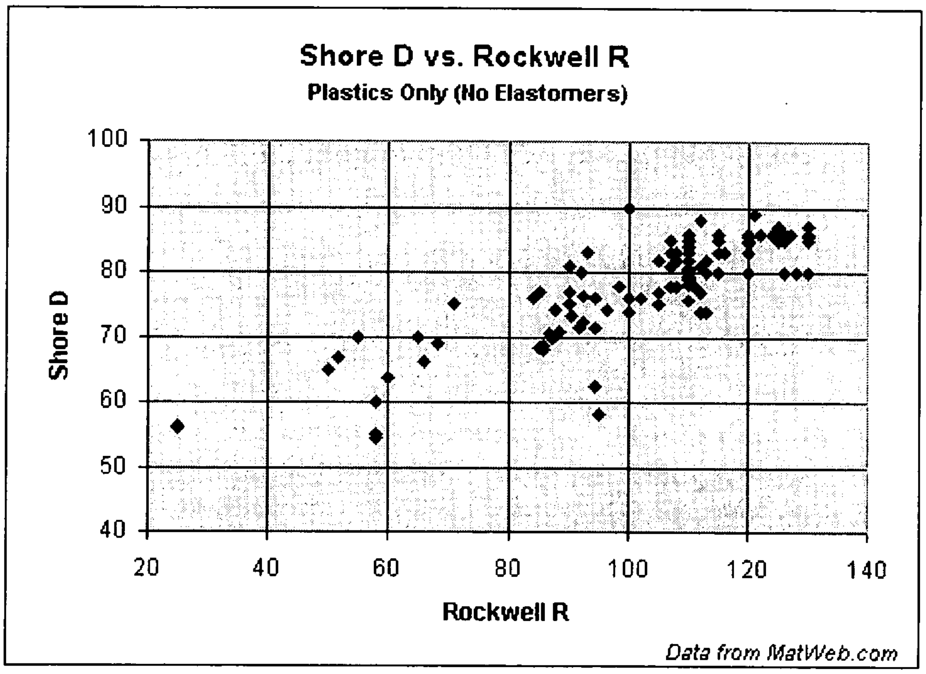
## Comparison of Shore Hardness Scales

**APPENDIX A**


Shore A vs. Shore D
Plastics and Elastomers
Shore D
Shore A
0
10
20
30
40
50
60
70
80
90
40
50
60
70
80
90
100
110
Data from MatWeb.com


Shore A vs. Shore D
Polyolefins Only
Shore D
Shore A
10
15
20
25
30
35
40
45
50
50
60
70
80
90
100
Data from MatWeb.com


Shore D vs. Rockwell M
Engineering Plastics Only (No Elastomers)
95
90
85
80
75
70
65
60
Shore D
40
60
80
100
120
140
Rockwell M
Data from MatWeb.com


Shore D vs. Rockwell R
Plastics Only (No Elastomers)
100
90
80
70
60
50
40
Shore D
20
40
60
80
100
120
140
Rockwell R
Data from MatWeb.com

TPE Tips Issue 6

# TPEtips

A publication of GLS Corporation, Thermoplastic Elastomers Division



## Understanding Hardness

The hardness of a material is often one of the first criteria considered when choosing a thermoplastic elastomer (TPE). GLS produces standard products ranging in hardness from 3 Shore A (softest) to 95 Shore A (hardest). Hardness is defined as a material's resistance to indentation when a static load is applied.

Hardness is also related to other important physical properties such as tensile and flexural modulus. Confusion can arise when discussing hardness due to the variety of measurement scales and its relationship to other material properties.

### MEASUREMENT OF HARDNESS

The most common instrument for measurement of hardness is called the Shore durometer. This instrument measures the depth of penetration from zero to 0.100 inches. A zero reading on the scale means the indenter penetrated with maximum depth. Likewise, a reading of 100 indicates no penetration of the indenter. The most common scale for TPE's is the Shore A scale. The Shore A durometer consists of a blunt indenter with moderate spring force. Shore A instruments are less accurate when readings are above 90. The Shore D durometer is more appropriate when hardnesses are above 90 Shore A. This instrument uses a sharper indenter and higher force. Softer TPE's use the Shore 00 scale for measurement of materials below 5 Shore A. Most soft gels and soft foam rubbers are measured using the Shore 00 scale.

### METHODS

Most materials will resist initial indenture but will yield further over time due to creep or relaxation. Durometer readings can either be taken instantaneously or after a specific delay time, which typically range between 5 and 10 seconds. An instantaneous reading will typically give a higher (or harder) reading than the delayed readings. Delayed readings are more representative of not only the hardness of the material, but the resiliency. A weak, less elastomeric material will creep more than a higher strength, more resilient material. GLS reports hardness values utilizing the 10 second reading.

***As an industry leader in soft tactile grip thermoplastic elastomers, GLS Corporation can suggest the right hardness range of products to meet your most demanding applications.***

APPENDIX B

## RELATIONSHIP TO OTHER PROPERTIES

Hardness is often confused with other properties including flexural modulus. Both properties reflect how the product feels to the touch. Flexural modulus measures the materials' resistance to bending, (See TIPS 4) and hardness measures the materials' resistance to penetration. Creep resistance and tensile strength are also directly related. Softer TPE's will creep more and have less tensile strength than a harder material. Coefficient of Friction (COF) varies indirectly with hardness. As the hardness increases, the COF generally decreases. Generally, higher hardness materials have better abrasion resistance.

The relationship between different hardness scales can be found in **Figure 1**. Some common materials are listed are placed on the respective hardness scale.

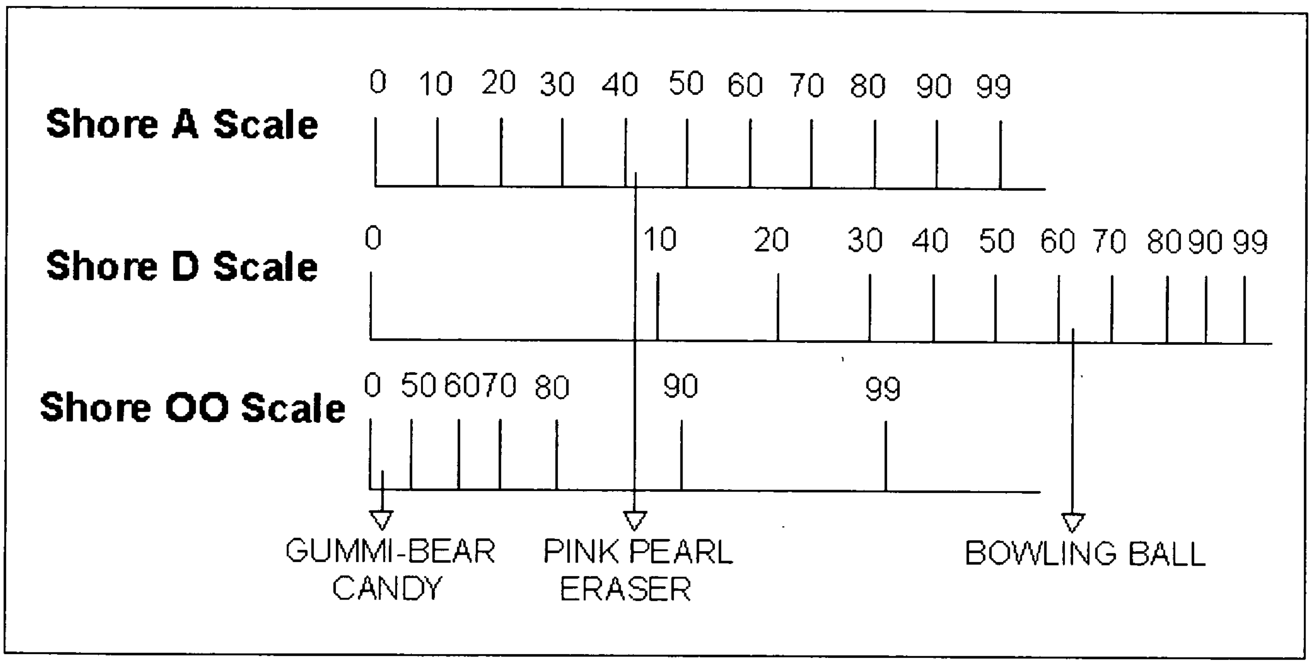



Figure 1. Relative Relationship Between Shore Hardness Scales

Note: No warranties, expressed or implied, including patent warranties, or warranties of merchantability or fitness for use are made with respect to product or information described above. The properties given in this technical data sheet are typical properties, and as such are dependent on molding conditions.

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